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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,059	12/23/2004	Yoshinori Wariishi	TOW-082US	7003

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EXAMINER	
PARSONS, THOMAS H	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
10/27/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/521,059	WARIISHI ET AL.	
	Examiner	Art Unit	
	THOMAS H. PARSONS	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 September 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 4-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 4-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

This is in response to the Amendment filed 15 September 2008.

(Previous) DETAILED ACTION

Specification

1. The objection to the disclosure because of a minor informality has been **withdrawn** in view of Applicants' Amendment.

Claim Rejections - 35 USC § 102

2. The rejections of claims 1-2 under 35 U.S.C. 102(b) as being anticipated by JP4-206162 have been **withdrawn**.

(New) DETAILED ACTION

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1, 4-5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP4-206162 in view of JP11-312531.

Claim 1: JP4-206162 in Figure 1 discloses a solid polymer cell assembly (10) comprising a cell assembly formed by juxtaposing a plurality of unit cells (12) such that electrode surfaces of the unit cells are aligned in parallel with each other, the unit cell each having an assembly including an anode (14A or 14B), a cathode (14A or 14B), and a solid polymer electrolyte membrane (13) interposed between the anode and the cathode,

wherein the unit cells includes an upstream unit cell provided on an upstream side in a flow direction of a reactant gas including at least one of an oxygen-containing gas and a fuel gas, and a downstream unit cell provided on a downstream side in the flow direction; and wherein the unit cells include an upstream unit cell provided on the upstream side in a flow direction of the oxygen-containing gas, and a downstream unit cell provided on the downstream side on the direction of the oxygen-containing gas; and

at least part of a reactant gas flow passage for the reactant gas extends serially from a passage formed on an upper side of the assembly of the upstream unit cell to a passage formed on a lower side of the assembly of the downstream unit cell. In Figure 1, JP4-206261 discloses that reactant gas flow passage includes a fuel gas flow passage and an oxygen-containing gas flow passage, and the oxygen-containing gas and the fuel gas flows in a counterflow manner in the oxygen-containing gas flow passage and the fuel gas flow passage along both surfaces of the assemblies of the unit cells.

JP4-206261 does not disclose a coolant flow passage is provided such that a coolant flows serially from the upstream unit cell provided on the upstream side in the flow direction of the oxygen-containing gas to the downstream unit cell provided on the downstream side in the flow direction of the oxygen--containing gas so that temperature of the downstream unit cell

provided on the downstream side in the flow direction of the oxygen-containing gas is kept higher than temperature of the upstream unit cell provided on the upstream side in the flow direction of the oxygen-containing gas.

JP11-312531 in Figure 2 discloses a fuel cell system wherein a coolant flow passage is provided such that a coolant flows serially from the upstream unit cell provided on the upstream side in the flow direction of the oxygen-containing gas to the downstream unit cell provided on the downstream side in the flow direction of the oxygen--containing gas so that temperature of the downstream unit cell provided on the downstream side in the flow direction of the oxygen-containing gas is kept higher than temperature of the upstream unit cell provided on the upstream side in the flow direction of the oxygen-containing gas (paragraphs [0045]-[0047]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell system of JP4-206261 with the coolant flow passage of JP11-312531 because JP11-312531 teaches a coolant flow passage that would have assisted in accelerating reaction and increasing battery cell output by successively raising the operation temperature of cells stacks connected in series in the flow direction.

Claim 4: JP4-206162 in Figure 1 discloses the structure of the upstream unit cell is different from structure of the downstream unit cell. In particular, JP4-206162 discloses that the H2 and O2 poles are connected alternately in series.

Claim 5: The recitation "the assembly of said upstream unit cell and the assembly of said downstream unit cell have the same power generation performance when the assembly of said upstream unit cell is operated at a low temperature in comparison with the assembly of said

downstream unit cell" has been considered and construed as a functional limitation that adds no additional structure to the fuel cell system.

However, because to the fuel cell system of the JP4-206162 combination structurally similar to and operated in similar fashion to that instantly claimed, it appears capable of having the same power generation performance when operated as claimed.

Claim 8: JP4-206162 in Figure 1 discloses a solid polymer cell assembly (10) comprising a cell assembly formed by juxtaposing a plurality of unit cells (12) such that electrode surfaces of the unit cells are aligned in parallel with each other, the unit cells each having an assembly including an anode (14A or 14B), a cathode (14A or 14B), and a solid polymer electrolyte membrane (13) interposed between said anode and said cathode,

wherein the unit cells includes an upstream unit cell provided on an upstream side in a flow direction of a reactant gas including at least one of an oxygen-containing gas and a fuel gas, and a downstream unit cell provided on a downstream side in the flow direction;

wherein at least part of a reactant gas flow passage for the reactant gas extends serially from a passage formed on an upper side of the assembly of the upstream unit cell to a passage formed on a lower side of the assembly of the downstream unit cell;

wherein a connection passage member is provided between the juxtaposed unit cells;

and a reactant gas connection passage formed in the connection passage member for serially supplying the reactant gas.

JP4-206162 does not disclose a coolant connection passage for serially supplying the coolant.

JP11-312531 in Figure 2 discloses a coolant connection passage for serially supplying the coolant (paragraphs [0045]-[0047]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell system of JP4-206261 with the coolant flow passage of JP11-312531 because JP11-312531 teaches a coolant flow passage that would have assisted in accelerating reaction and increasing battery cell output by successively raising the operation temperature of cells stacks connected in series in the flow direction.

5. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP4-206261 in view of JP11-312531 as applied to claims 1 and 4 above, and further in view of Haridoss et al. (6,821,661).

JP4-206261 and JP11-312531 are as applied, argued, and disclosed above, and incorporated herein.

Claim 6: The JP4-206261 combination does not disclose that the cathode of the assembly of the upstream unit cell has a hydrophobic diffusion layer having low porosity, and the anode of the assembly of the upstream unit cell has a hydrophilic diffusion layer having high porosity; and the hydrophobic diffusion layer having low porosity is provided on the upper side, and the hydrophilic diffusion layer having high porosity is provided on the lower side.

Claim 7: The JP4-206261 combination does not disclose that the anode of the assembly of the downstream unit cell has a hydrophobic diffusion layer having low porosity, and the cathode of the assembly of the downstream unit cell has a hydrophilic diffusion layer having

high porosity; and the hydrophobic diffusion layer having low porosity is provided on the upper side, and the hydrophilic diffusion layer having high porosity is provided on the lower side.

Haridoss et al. in Figure 1 disclose cathode having a hydrophobic diffusion layer (606) having low porosity, and an anode having a hydrophilic diffusion layer (604) having high porosity (col. 8: 5-19)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cells of the JP4-206261 combination by incorporating the anode and cathode of Haridoss et al. because Haridoss as et. teach an assembly that would have improved water management and tolerance of the anode against flooding, or water logging thereby improving the overall performance of the fuel cell.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS H. PARSONS whose telephone number is (571)272-1290. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795

Thomas H Parsons
Examiner
Art Unit 1795

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